

CLAIMS

1. Apparatus comprising:

an inkjet print head chip having MOS logic blocks, resistor elements to heat the chip, and a controller of the resistor elements; and

5 temperature sense resistors implanted in the chip, the temperature sense resistors being operatively connected to the controller of the resistor elements to enable the controller to monitor the chip temperature to control the resistor elements to heat the chip.

2. The apparatus of claim 1, wherein the temperature sense resistors have a
10 sheet resistance of at least $20\ \Omega/$ and a temperature coefficient of resistivity of at least $0.0010\ \Omega/^{\circ}\text{C}$.

3. The apparatus of claim 1, wherein the temperature sense resistors have a sheet resistance of at least $75\ \Omega/$ and a temperature coefficient of resistivity of at least $0.0020\ \Omega/^{\circ}\text{C}$.

15 4. The apparatus of claim 1, wherein the temperature sense resistors have a sheet resistance of at least $500\ \Omega/$ and a temperature coefficient of resistivity of at least $0.0030\ \Omega/^{\circ}\text{C}$.

5. The apparatus of claim 1, wherein the temperature sense resistors have a sheet resistance of at least $1000\ \Omega/$ and a temperature coefficient of resistivity of at
20 least $0.0040\ \Omega/^{\circ}\text{C}$

6. The apparatus of any prior claim, wherein the temperature sense resistors comprise N-Well material.

7. The apparatus of any of claims 1-5, wherein the temperature sense resistors comprise NSD material.

25 8. The apparatus of any of claims 1-5, wherein the temperature sense resistors comprise LDD material.

9. The apparatus of any of claims 1-5, wherein the temperature sense resistors comprise PSD material.

10 10. The apparatus of any prior claim, wherein the inkjet print head chip includes 1 - 1000 temperature sense resistors.

11. The apparatus of any prior claim, wherein each temperature sense resistor is $0.05 - 5000\ \mu\text{m}$ wide by $0.01 - 400,000\ \mu\text{m}$ long by $0.05 - 4\ \mu\text{m}$ thick.

12. The apparatus of any prior claim, wherein each temperature sense resistor

is 1 - 2000 μm wide by 1 - 200,000 μm long by 0.1 - 3 μm thick.

13. The apparatus of any prior claim, wherein each temperature sense resistor is 2 - 1000 μm wide by 2 - 100,000 μm long by 0.2 - 2 μm thick.

14. The apparatus of any prior claim, further comprising an inkjet print head
5 comprising the inkjet print head chip.

15. The apparatus of claim 13, further comprising an ink jet printer comprising the inkjet print head.

16. A method of controlling the temperature of an inkjet print head chip having MOS logic blocks, comprising:

10 providing the print head chip with at least one substrate heater to heat the chip;
providing the print head chip with a controller of the substrate heater;
implanting temperature sense resistors in the chip;

operatively connecting the temperature sense resistors to the controller of the substrate heater to enable the controller to monitor the chip temperature to control the
15 substrate heater to heat the chip; and

using the controller to control the substrate heater to heat the chip.

17. The method of claim 16, wherein the temperature sense resistors have a sheet resistance of at least 20 $\Omega/$ and a temperature coefficient of resistivity of at least 0.0010 $\Omega/^{\circ}\text{C}$.

20 18. The method of claim 16, wherein the temperature sense resistors have a sheet resistance of at least 75 $\Omega/$ and a temperature coefficient of resistivity of at least 0.0020 $\Omega/^{\circ}\text{C}$.

19. The method of claim 16, wherein the temperature sense resistors have a sheet resistance of at least 500 $\Omega/$ and a temperature coefficient of resistivity of at
25 least 0.0030 $\Omega/^{\circ}\text{C}$.

20. The method of claim 16, wherein the temperature sense resistors have a sheet resistance of at least 1000 $\Omega/$ and a temperature coefficient of resistivity of at least 0.0040 $\Omega/^{\circ}\text{C}$

21. The method of any one of claims 16-20, wherein the temperature sense
30 resistors comprise N-Well material.

22. The method of any one of claims 16-20, wherein the temperature sense resistors comprise NSD material.

23. The method of any one of claims 16-20, wherein the temperature sense

resistors comprise LDD material.

24. The method of any one of claims 16-20, wherein the temperature sense resistors comprise PSD material.

5 25. The method of any one of claims 16-24, wherein the inkjet print head chip includes 1 - 1000 temperature sense resistors.

26. The method of any one of claims 16-25, wherein each temperature sense resistor is 0.05 - 5000 μm wide by 0.01 - 400,000 μm long by 0.05 - 4 μm thick.

27. The method of any one of claims 16-26, wherein each temperature sense resistor is 1 - 2000 μm wide by 1 - 200,000 μm long by 0.1 - 3 μm thick.

10 28. The method of any one of claims 16-27, wherein each temperature sense resistor is 2 - 1000 μm wide by 2 - 100,000 μm long by 0.2 - 2 μm thick.

29. The method of any one of claims 16-28, further comprising installing the inkjet print head chip in an inkjet print head.

15 30. The method of claim 29, further comprising installing the inkjet print head in an ink jet printer.

31. The invention of any prior claim, wherein the MOS logic blocks are CMOS logic blocks.

32. The invention substantially as shown and described herein.